MATH116-02 QUIZ 2

Name:
Student Number:
Date: June 8, 2007

Question 1. Let $z = x^y + \sin(x^2 y)$. Evaluate $\dfrac{\partial z}{\partial y}$ and $\dfrac{\partial^2 z}{\partial x\, \partial y}$.

Solution

$$z_y = (\ln x)x^y + x^2 \cos(x^2 y)$$
$$z_{xy} = x^{y-1} + y(\ln x)x^{y-1} + 2x\cos(x^2 y) - 2x^3 y \sin(x^2 y)$$

Question 2. Assume the equation $xz + y \ln z - z^2 + 4 = 0$ defines z as a function of x and y implicitly. Find $\dfrac{\partial z}{\partial x}$ at the point $(-3, -1, 1)$.

Solution
Equation $xz + y \ln z - z^2 + 4 = 0$ defines a surface in the space and $P(-3, -1, 1)$ is on this surface. Then we find

$$z_x(x + y/z - 2z) = -z$$

Hence $-6z_x(P) = -1$ or $z_x(P) = 1/6$